

FIG. 1

DNA sequence for human
preproparathyroid hormone.

10 30 50
ATGATHCCNGCNAARGAYATGGCNAARGTNATGATHGTNATGYTNGCNATHGTGYTTYT

70 90 110
ACNAARWSNGAYGGNAARWSNGTNAARAARMGNWSNGTNWSNGARATHCARYTNATGCAY

130 150 170
AAYYTNGGNAARCAYYTNAAYWSNATGGARMGNGTNGARTGGYTNGMNAARAARYTNCAR

190 210 230
GAYGTNCAYAAYYTGTNGCNYTNGGNGCHCCNYTNGCNCNMGNNGAYGCNNGNWSNCAR

250 270 290
MGNCNMGNNAARAARGARGAYAAAYGTNYTNGTNGARWSNCAYGARAARWSNYTNGGNGAR

310 330
GCNGAYAARGCNGAYGTNAAYGTNYTNACNAARGCNAARWSNCARTRR

M = A or C
R = A or G
W = A or T
S = C or G
Y = C or T
H = A or C or T
N = A or G or C or T.

FIG. 2

DNA sequence for human
preproparathyroid hormone in plasmid pSSHPTH-10.

```
      10      30      50
ATGATGATACCTGCAAAAGACATGGCTAAAGTTATGATTGTCATGTTGGCAATTTGTTTT

      70      90      110
CTTACAAAATCGGATGGGAAATCTGTTAAGAAGAGATCTGTGAGTGAAATACAGCTTATG

      130      150      170
CATAACCTGGGAAAACATCTGAACTCGATGGAGAGAGTAGAATGGCTGCGTAAGAAGCTG

      190      210      230
CAGGATGTGCACAATTTTGTGGCCCTGGAGCTCCTCTAGCTCCCAGAGATGCTGGTTCC

      250      270      290
CAGAGGCCCCGAAAAAAGGAAGACAATGTCTTGGTTGAGAGCCATGAAAAAAGTCTTGGA

      310      330
GAGGCAGACAAAGCTGATGTGAATGTATTAAGCTAAATCCCAGTGA
```

FIG. 3

Portion of DNA sequence of the plasmid
for insertion into *E. coli*, coding for human
preproparathyroid hormone with flanking sequences.

```

      10              30              50
TATGATGATHCCNGCNAARGAYATGGCNAARGTNATGATHGTNATGYTNGCNATHGTGTT

      70              90              110
YYTNACNAARWSNGAYGGNAARWSNGTNAARAARMGNWSNGTNWSNGARATHCARYTNAT

      130             150             170
GCAYAAYYTNGGNAARCAYYTNAAYWSNATGGARMGNGTNGARTGGYTNGMNAARAARYT

      190             210             230
NCARGAYGTNCAYAAYTTYGTNGCNYTNGGNGCNCNYTNGCNCNCNMGNNGAYGCNGGNWS

      250             270             290
NCARMGNCCNMGNAARAARGARGAYAAAYGTNYTNGTNGARWSNCAYGARAARWSNYTNGG

      310             330             350
NGARGCNGAYAARGCNGAYGTNAAYGTNYTNACNAARGCNAARWSNCARTRRAAATGAAA

      370             390             410
ACAGATATTGTCAGAGTTCTGCTCTAGACAGTGTAGGGCAACAATACATGCTGCTAATTC

      430
AAAGCTCTATTA

```

M = A or C
R = A or G
W = A or T
S = C or T
Y = C or T
H = A or C or T
N = A or G or C or T.

FIG. 4

DNA sequence for human preproparathyroid hormone in plasmid pSSHPTH-10 with flanking sequences.

```
      10              30              50
TATGATGATACCTGCAAAAGACATGGCTAAAGTTATGATTGTCATGTTGGCAATTTGTTT

      70              90              110
TCTTACAAAATCGGATGGGAAATCTGTTAAGAAGAGATCTGTGAGTGAAATACAGCTTAT

      130             150             170
GCATAACCTGGGAAAACATCTGAACTCGATGGAGAGAGTAGAATGGCTGCGTAAGAAGCT

      190             210             230
GCAGGATGTGCACAATTTTGTGGCCCTTGGAGCTCCTCTAGCTCCCAGAGATGCTGGTTC

      250             270             290
CCAGAGGCCCCGAAAAAAGGAAGACAATGTCTTGTTGAGAGCCATGAAAAAAGTCTTGG

      310             330             350
AGAGGCAGACAAAGCTGATGTGAATGTATTAACTAAAGCTAAATCCCAGTGAAAATGAAA

      370             390             410
ACAGATATTGTCAGAGTTCTGCTCTAGACAGTGTAGGGCAACAATACATGCTGCTAATTC

      430
AAAGCTCTATTA.
```

FIG. 5

DNA sequence coding for
preproparathyroid hormone in pSSHPTH-10 with flanking
sequences, showing the corresponding amino acid
sequence of preproparathyroid hormone.

```

      10              30              50
TATGATGATACCTGCAAAAGACATGGCTAAAGTTATGATTGTCATGTTGGCAATTTGTTT
  MetIleProAlaLysAspMetAlaLysValMetIleValMetLeuAlaIleCysPh

      70              90              110
TCTTACAAAATCGGATGGGAAATCTGTTAAGAAGAGATCTGTGAGTGAAATACAGCTTAT
eLeuThrLysSerAspGlyLysSerValLysLysArgSerValSerGluIleGlnLeuMe

      130              150              170
GCATAACCTGGGAAAACATCTGAACTCGATGGAGAGAGTAGAATGGCTGCGTAAGAAGCT
tHisAsnLeuGlyLysHisLeuAsnSerMetGluArgValGluTrpLeuArgLysLysLe

      190              210              230
GCAGGATGTGCACAATTTTGTGGCCCTTGGAGCTCCTCTAGCTCCCAGAGATGCTGGTTC
uGlnAspValHisAsnPheValAlaLeuGlyAlaProLeuAlaProArgAspAlaGlySe

      250              270              290
CCAGAGGCCCCGAAAAAAGGAAGACAATGTCTTGGTTGAGAGCCATGAAAAAAGTCTTGG
rGlnArgProArgLysLysGluAspAsnValLeuValGluSerHisGluLysSerLeuGl

      310              330              350
AGAGGCAGACAAAGCTGATGTGAATGTATTAATAAGCTAAATCCCAGTGAAAATGAAA
yGluAlaAspLysAlaAspValAsnValLeuThrLysAlaLysSerGlnEnd

      370              390              410
ACAGATATTGTCAGAGTTCTGCTCTAGACAGTGTAGGGCAACAATACATGCTGCTAATTC

      430
AAAGCTCTATTA.
```

Figure 6. Nucleotide sequence of the MF 1-HPTH fusion gene from pS LX5-HPTH1. Nucleotide nos. 1-173 makeup the MF 1 promoter region and 5' noncoding sequence. 174-440 is the MF 1 N-terminal coding sequence. 441-695 is the HPTH sequence obtained from pSSHPTH-10. 696-726 is an HPTH 3' noncoding sequence from pSSHPTH-10. 727-732 is from pUC19. 733-874 is MF 1 3' noncoding sequence and transcriptional termination signal.

```
10      10      30      50
AGTGCAAGAAAACCAAAAAGCAACAACAGGTTTTGGATAAGTACATATATAAGAGGGCCT

      70      90      110
TTTGTTCCTCATCAAAAATGTTACTGTTCTTACGATTCATTTACGATTCAAGAATAGTTCA

15      130      150      170
AACAGAAGATTACAACTATCAATTTTCATACACAATATAAACGACCAAAAGAATGAGAT

      190      210      230
TTCCTTCAATTTTTACTGCAGTTTTATTTCGCAGCATCCTCCGCATTAGCTGCTCCAGTCA

      250      270      290
ACACTACAACAGAAGATGAAACGGCACAAATTCCGGCTGAAGCTGTCATCGGTTACTCAG

20      310      330      350
ATTTAGAAGGGGATTTTCGATGTTGCTGTTTTGCCATTTTCCAACAGCACAAATAACGGGT

      370      390      410
TATTGTTTATAAATACTACTATTGCCAGCATTGCTGCTAAAGAAGAAGGGGTATCTTTGG

      430      450      470
ATAAAAGAGAGGCTGAAGCTTCTGTGAGTGAAATACAGCTTATGCATAACCTGGGAAAAC

25      490      510      530
ATCTGAACTCGATGGAGAGAGTAGAATGGCTGCGTAAGAAGCTGCAGGATGTGCACAATT

      550      570      590
TTGTTGCCCTTGGAGCTCCTCTAGCTCCCAGAGATGCTGGTTCCCAGAGGCCCGAAAAA

      610      630      650
AGGAAGACAATGTCTTGGTTGAGAGCCATGAAAAAAGTCTTGGAGAGGCAGACAAAGCTG

      670      690      710
5 ATGTGAATGTATTAATACTAAAGCTAAATCCCAGTGAAAATGAAAACAGATATTGTCAGAGT
```

730 750 770 08/340664
TCTGCTCTA TCGACTTTGTTCCCACTGTACTTT TCGTACAAAATACAAATATAC

790 810 830
TTTTCAATTTCTCCGTAAACAACCTGTTTTCCCATGTAATATCCTTTTCTATTTTTTCGTTT

10

850 870
CGTTACCAACTTTACACATACTTTATATAGCTAT

Fig. 7. Partial DNA sequence for the plasmid 08/340664
insertion into yeast in which: Nucleotide nos. 1-173
makeup the MF 1 promoter region and 5' noncoding
sequence. 174-440 is the MF 1 N-terminal coding
sequence. 441-695 is an HPTH sequence. 696-726 is an
HPTH 3' noncoding sequence from pSSHPTH-10. 727-732 is
from pUC19. 733-874 is MF 1 3' noncoding sequence and
transcriptional termination signal.

10
50

10

30

AGTGCAAGAAAACCAAAAAGCAACAACAGGTTTTGGATAAGTACATATATAAGAGGGCCT

70

90

110

TTTGTTCCCATCAAAAATGTTACTGTTCTTACGATTCATTTACGATTCAAGAATAGTTCA

15

130

150

170

AACAAGAAGATTACAAACTATCAATTTTCATACACAATATAAACGACCAAAAGAATGAGAT

190

210

230

TTCCTTCAATTTTTACTGCAGTTTTATTTCGCAGCATCCTCCGCATTAGCTGCTCCAGTCA

250

270

290

ACACTACAACAGAAGATGAAACGGCACAAATTCCGGCTGAAGCTGTCATCGGTTA_{CT}CAG

20

310

330

350

ATTTAGAAGGGGATTTTCGATGTTGCTGTTTTGCCATTTTCCAACAGCACAAATAACGGGT

370

390

410

TATTGTTTATAAATACTACTATTGCCAGCATTGCTGCTAAAGAAGAAGGGGTATCTTTGG

430

450

470

25

ATAAAAGAGAGGCTGAAGCTWSNGTNWSNGARATHCARYTNATGCAYAAYYTNGGNAARC

490

510

530

AYYTNAAYWSNATGGARMGNGTNGARTGGYTNGMNAARAARYTNCARGAYGTNCAYAAYT

550

570

590

TYGTNGCNYTNGGNGCNCNCCNYTNGCNCNMGNAYGCNGGNWSNCARMGNCNCNMGNAARA

610

630

650

ARGARGAYAAYGTNYTNGTNGARWSNCAYGARAARWSNYTNGGNGARGCNGAYAARGCNG

670

690

710

5

AYGTNAAYGTNYTNACNAARGCNAARWSNCARTTAAATGAAAACAGATATTGTCAGAGT

730 750 770 08/340664
TCTGCTCTAGCGACTTTGTTCCCACTGTACTTTTCGTACAAAATACAATATAC

790 810 830
TTTTCATTTCTCCGTAAACAACCTGTTTTCCCATGTAATATCCTTTTCTATTTTTCGTTT

10

850 870
CGTTACCAACTTTACACATACTTTATATAGCTAT, wherein

15

M - A or C
R - A or G
W - A or T
S - C or G
Y - C or T
H - A or C or T
N - A or G or C or T

a _____ **b** _____ **c** _____

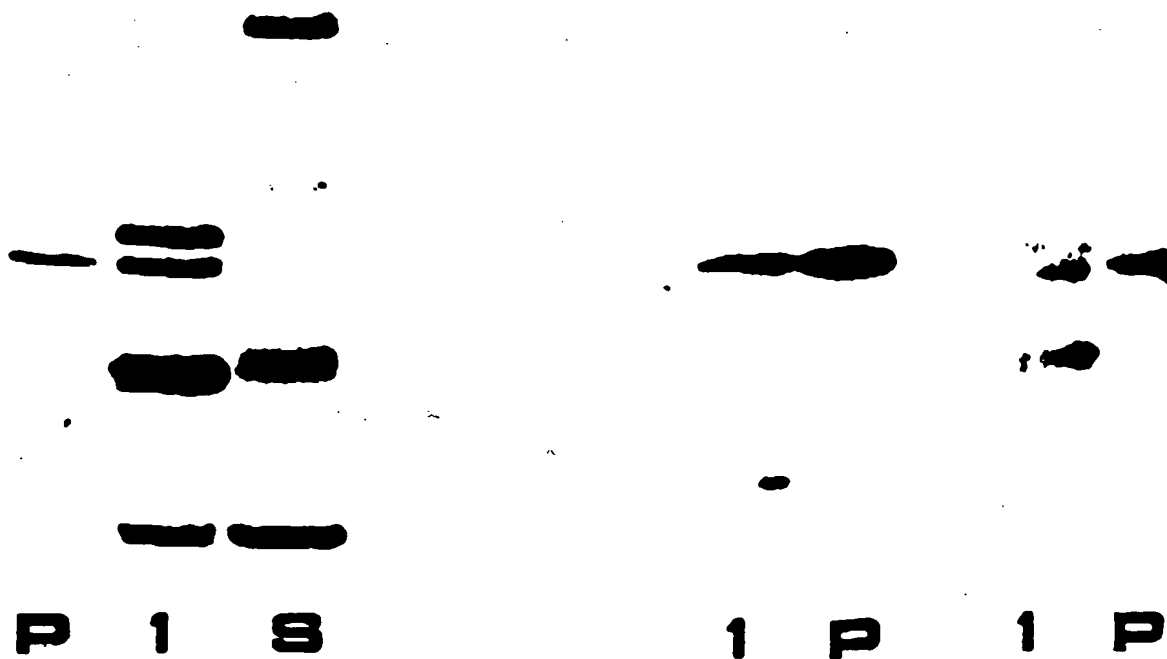


FIG. 8

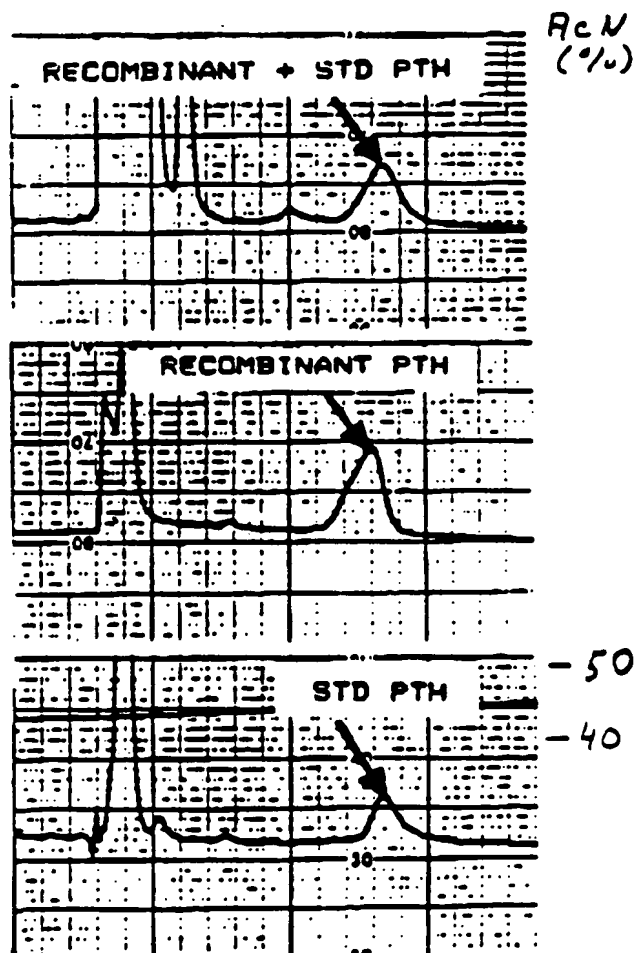
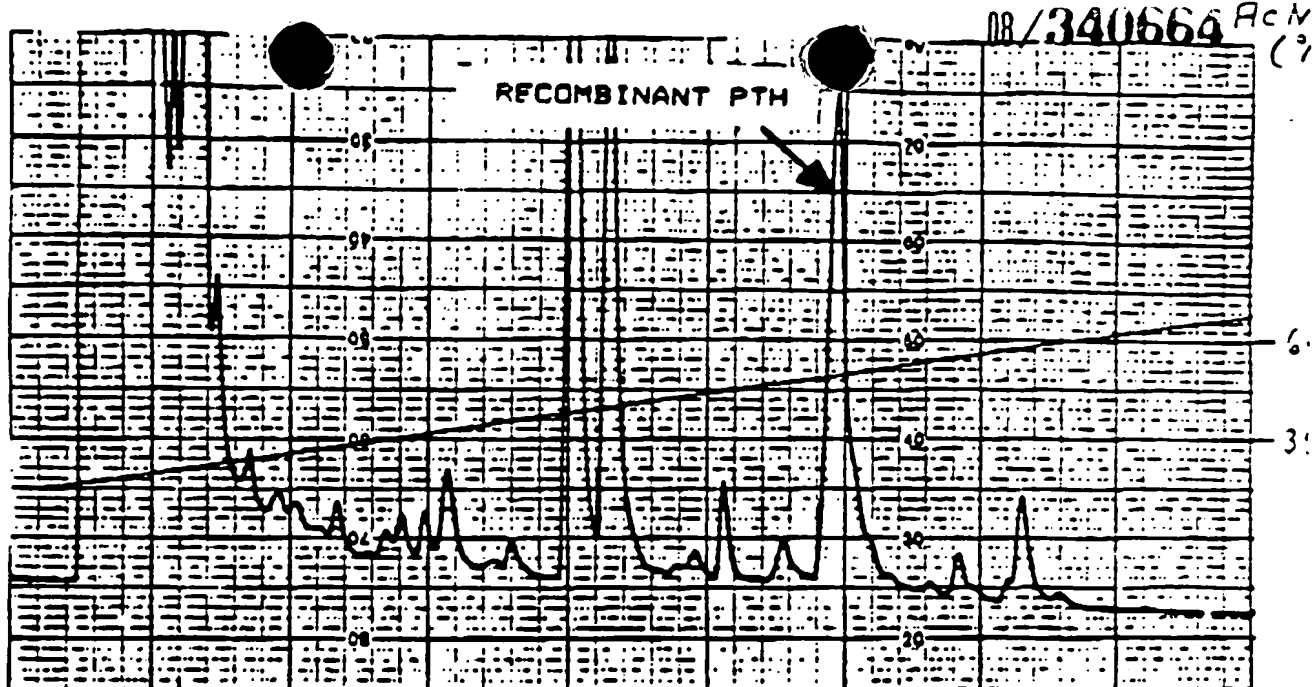


FIG. 9

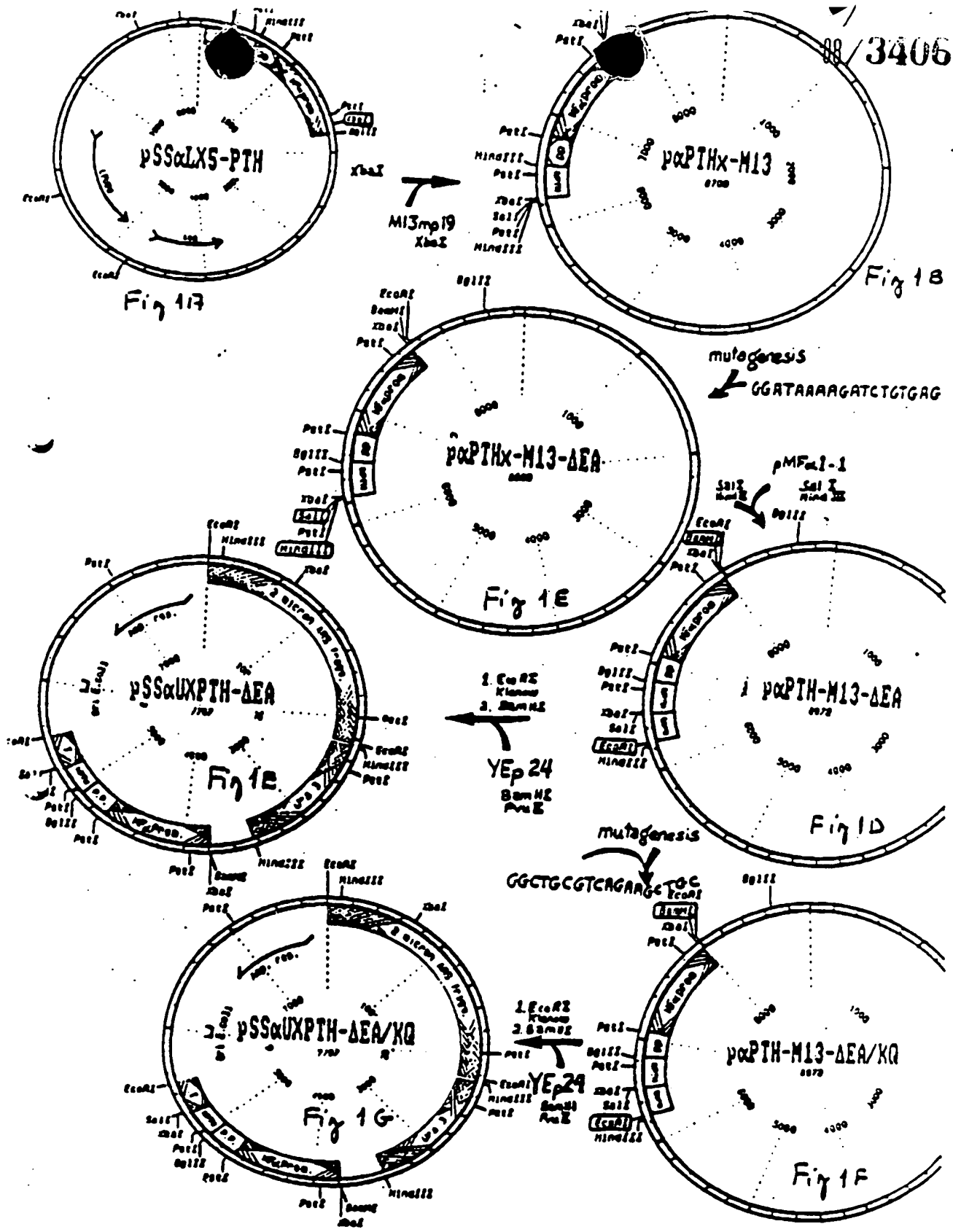


FIG. 10

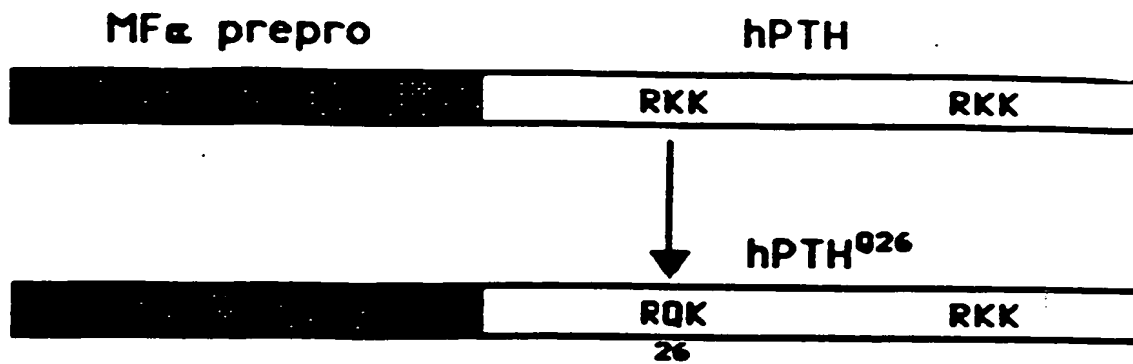


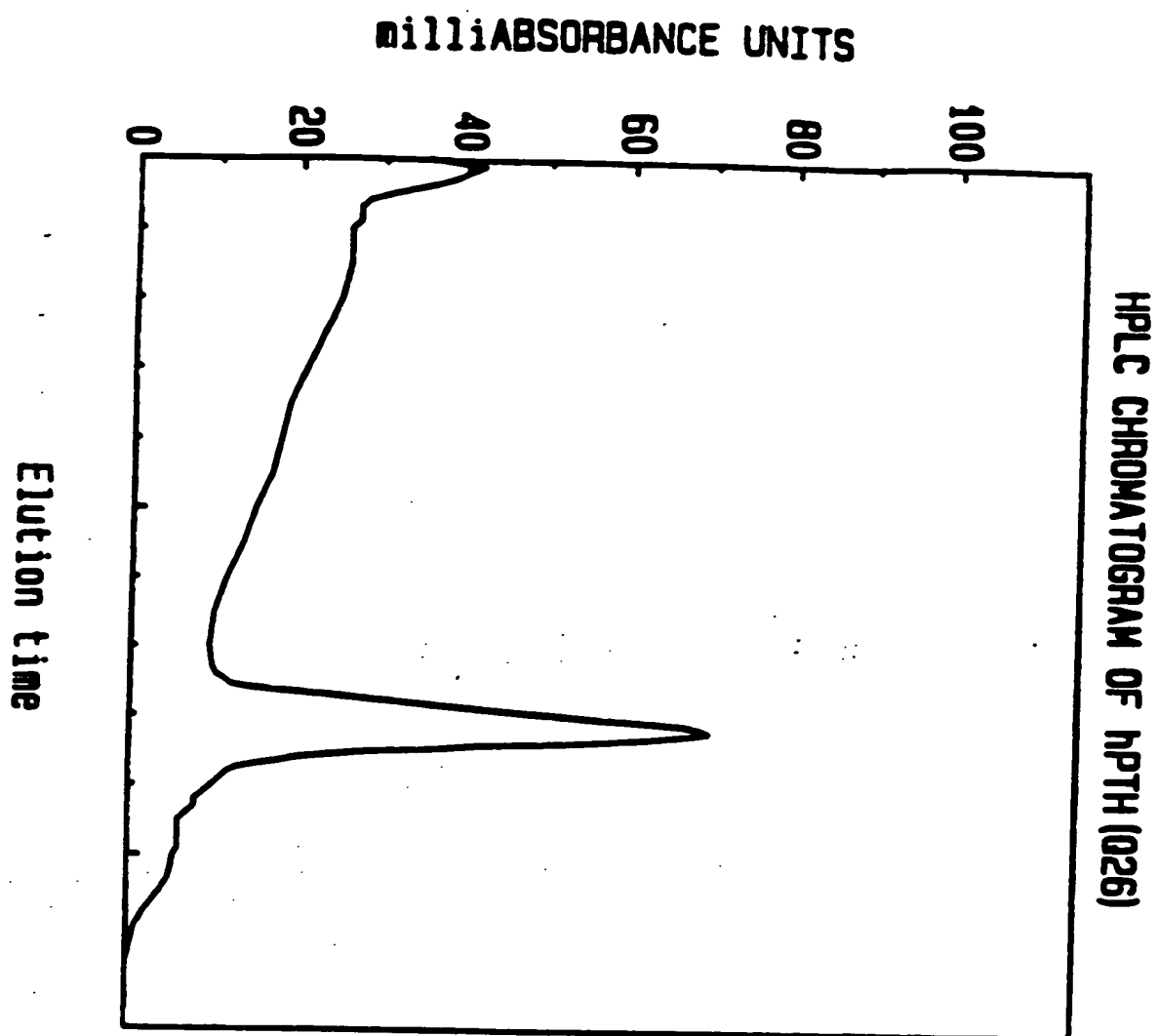
FIG. 11



1 2 M

FIG. 12

A



B



FIG. 13

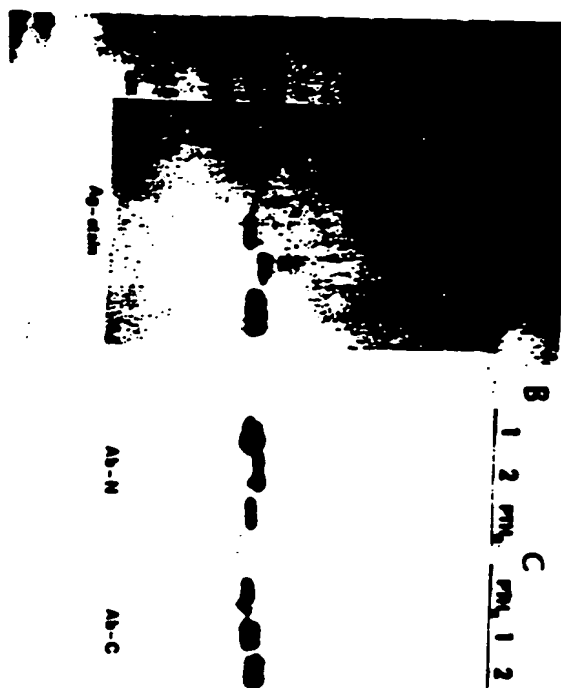


FIG. 14

FIG. 15

